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ABSTRACT

This study examined children's health care utilization at six sites within a Northern California health maintenance organization (HMO). Approximately 300 parent-child dyads seeking medical attention at the HMO sites were subjects. Parents completed the Pediatric Symptom Checklist (PSC) and reported the presence of a serious or chronic illness. In addition, psychiatric/medical utilization and costs for the previous year were retrieved from a regional database. According to PSC scores, 13 percent of children were experiencing psychosocial dysfunction and there was a consistent linear relationship between child PSC positive status and health care utilization. Health care utilization was highest for children with psychosocial morbidity (or chronic illness) and higher among younger children, decreasing with age as psychiatric costs progressively increased. Results suggest that the costs of timely and appropriate mental health care for young children may be offset by decreased general health care costs. (DB)

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Economic Implications of Undetected Mental Health Issues in the Pediatric Population

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Introduction

Early detection of children's psychosocial problems in primary care may have the potential to offset displaced health care utilization. Health care utilization studies suggest that adults with psychiatric disorders average twice as many visits to their primary care providers than those without them (Hankin & Oktay, 1979). The findings for children and adolescents are less clear. However, Zuckerman (1996) did document that parent reported behavior problems were the most significant predictor of medical utilization. Parental retrospective report was the primary measure utilized to document children's health care utilization. The study described in this summary adds analyses of data from regional medical databases to parent and physician report to examine children's health care utilization at six sites within a Northern California HMO.

Method

Subjects/Sites

The study was conducted at six pediatric facilities of a large Health Maintenance Organization composed of 28 facilities serving twelve counties with a population of more than 2.5 million in the Northern California Region. Approximately 28% of members across these sites are 18 years of age or under. At each facility, 40-50 pediatricians agreed to participate.

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All 2-18 year old children accompanied by a parent seeking medical attention at the six HMO sites were considered eligible for this study. Approximately 300 parent-child dyads from each of the six sites participated in this study. A total of 1840 dyads were enrolled and randomly screened for baseline rates of psychosocial morbidity.

A research assistant approached the parent to request participation in the study, and obtained informed consent. When this procedure was not possible due to high patient volume, a randomized sample of patients was obtained by selecting patients from the doctors' appointment schedules through a circulating time pattern. All appointment types from routine childcare to urgent appointments were represented. Data were collected for 4 hours a day on week-days or evenings over a period of four months.

Instruments

Pediatric Symptom Checklist (PSC: Jellinek, Murphy & Burns, 1986). The PSC is a 35-item questionnaire that is normed for children 2-18 years of age. This is a well-validated parent completed questionnaire that consists of 35 items that are rated as *never, sometimes* or *often present*. Item scores are summed and the total score is recorded into a dichotomous variable indicating psychosocial impairment. For children 6 through 18 years the cut-off score is 28 or higher, and for children two through five, the cut off is 24 or higher. The PSC has been validated for minority and economically disadvantaged populations (Murphy & Jellinek, 1988). The PSC is completed by parents while in a waiting room during a pediatric office visit and can be completed and scored in less than five minutes. Additionally, principal component factor analysis using pair-wise deletions and Varimax rotations on the items of the PSC revealed three factors: internalizing, externalizing and attention-deficit/hyperactivity (see Table 2).

Chronic Illness. Chronic illness was determined in two ways. Parents were asked to report a serious or chronic illness suffered by the child. Approximately 14.4% of the parents reported some chronic or serious condition. Objective chart review utilizing a comprehensive list of chronic illness diagnoses, including asthma, diabetes, and cancer as well as severe acute conditions such as head injuries following standard criteria documented that 18.2% of the total sample had some chronic or serious illness, excluding behavioral or mental health diagnoses.

Regional Data Analysis

The standardized instruments described above were used to measure morbidity in children and parents. In addition, psychiatric/medical utilization and costs for the previous year were retrieved from a regional database; these data included regularly scheduled appointments, urgent appointments, emergency room visits and hospitalizations. Ancillary cost, i.e. laboratory tests, EKG, etc., were included, as well as administrative overhead. Cost information from the general ledger was allocated using the Cost Management Information System. Multiple regression analyses were used to measure the cost of health care for the selected population.

Results

According to PSC scores, 13% of children were experiencing psychosocial dysfunction (see Table 1). Results of several multiple linear regression analyses showed a consistent linear relationship between child PSC positive status and health care utilization. According to the linear regression model, a child classified as an Internalizer averaged 3.3 visits above the sample's mean in the year prior to the index visit ($p< .05$; see Table 3). Children classified as Externalizers visited their pediatrician 2 visits above the mean. Chronic illness also had a significant impact on health services utilization. Chronically ill children averaged an additional 6.2 visits per year.

Additional variables entered in the model did not predict additional health care utilization. Overall, PSC positive Internalizing or Externalizing status and chronic illness significantly predicted increased health care visits (*RR*=. 24, $p<.01$).

PSC positive status remained a significant predictor of increased health care utilization after removing chronically ill children from subsequent regression analyses. Additionally, internalizer children averaged 3.8 more health care visits than others in the sample ($p<.01$), and externalizers averaged 1.9 additional visits ($p<.01$).

The mean pediatric health care costs for each child in the HMO system was $393 per year. As expected, chronic illness contributed to health care costs. Chronically ill children cost an average of $1138, $745 in excess of the mean, during the one year prior to parents' completion of the PSC ($p<.001$). Psychosocial status was also a significant predictor of health care costs for the same time period. Children classified as Internalizers cost the study HMO a mean 412 extra dollars above the mean for all children, or $805 per year ($p<.05$). Similarly, children classified as Externalizers cost an additional $177 per year above the mean, with a total cost of $570, although these data reflected a trend rather than statistical significance, $p<.07$ (see Table 3).

Because chronic illness contributes a predictable influence on the variability of health care costs, additional regression analyses were run with chronically ill children excluded. With the effects of chronic illness controlled, PSC Internalizers cost the health care system an additional $479 above the mean cost, or $872 total per year ($p<.01$) and Externalizers also contributed significantly to increased health care dollars ($198 additional, $591 total cost; $p<.02$). These analyses demonstrate the stability of the finding that scores above the cut off for the PSC were significantly related to increased health costs.

Table 1
Sociodemographics and Background Characteristics of the Total Sample and of Children with Psychosocial Dysfunction, N=1840

	Sample % (*n*)	PSC Positive Children % (*n*)
Pre-school-age (2-5)	41% (758)	13% (96/739)
School-age (6-18)	59% (1082)	13% (134/995)
Parental Marital Status		
Single parent family	26%(478)	19%(91/473)
Two parent family	74% (1359)	11% (148/1328)
Parent's Education Level		
<High School	5%(95)	19%(17/91)
High school graduate	18%(329)	15%(47/325)
Some College	37%(684)	13%(89/669)
College graduate	25%(446)	12%(54/438)
Post graduate	16% (272)	12%(32/262)
Household Income		
< $15,000$	7%(147)	25%(36/145)
15,000-$30,000	18%(326)	15%(47/318)
$30,000-50,000	28%(492)	13%(65/484)
$50,000-100,000	36%(638)	12%(73/629)
>$100,000	10%(171)	8%(14/169)
Race		
African American	12%(207)	17%(34/205)
Caucasian	45%(815)	12%(95/805)
Hispanic	16%(281)	14%(39/275)
Asian	12%(224)	10%(22/216)
Multi-racial	12%(6)	
Native American	.4%(48)	
Other	3%(48)	

Discussion

Health care utilization was highest for children with psychosocial morbidity; higher among younger children, decreasing with age as psychiatric costs progressively increased. Results suggest that the costs of timely and appropriate mental health care for young children may be offset by decreased general health care costs, furthering pediatricians' mission of early intervention.

References

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Zuckerman B, Moore KA, & Glei, D. (1996). Association between child behavior problems and frequent visits. *Archives of Pediatric Adolescent Medicine, 150*:146-153.

Table 2
Internalizing and Externalizing Subscales of the Pediatric Symptom Checklist Derived from Factor Analysis with Varimax Rotation

Internalizing Items	Externalizing Items
For 2-5 year olds:	**For 2-5 year olds**
1. Tires easily, little energy	1. Fights with other children
2. Is down on him or herself	2. Hits others
3. Feels sad, unhappy	3. Gets upset easily
4. Feels hopeless	4. Hard to control
5. Worries a lot	5. teases others
6. Seems to have less fun	6. Blames other for troubles
	7. Refuses to share
For 6-19 year olds:	**For 6-19 year olds**
1. Is afraid of new situations	1. Takes unnecessary risks
2. Is down on him or herself	2. Does not listen to rules
3. Feels sad, unhappy	3. Does not understand other's feelings
4. Feels hopeless	4. Fights with other children
5. Worries a lot	5. teases others
6. Seems to have less fun	6. Blames other for troubles
	7. Refuses to share

Table 3
Comparison of Mean Health and Psychiatric Care Utilization/Costs for Children with Psychosocial Dysfunction and/or Chronic Illness and the Total Sample for One Year Previous to Screening

	Mean Number of Health Care Visits Utilization	Mean Health Care Costs	Mean Psychiatric Utilization
Total Sample	4.3	$393	$10
Internalizer Children	7.6*	$805*	$-86
Externalizer Children	6.3*	$570	$-57
Chronically Ill Children	10.5**	$1138**	$26

*$p<.05$
**$p<.001$